

SAE Detroit Section
Student Exhibit Competition
Tuesday, April 24, 2012 at 10:00 a.m.

Judging Criteria & Rules

Judging will focus on the following six categories:

Usage of SAE Technical Standard (10 points)

- Identify and define Technical Standard
- Proper usage exhibited in presentation

Display (20 Points)

- Content
- Organization
- Quality

Technical Content (30 Points)

- Problem Definition
- Background
- Innovation
- Research & Development
- Implementation
- Validation

Teamwork / Project Management (10 Points)

- Planning
- Decision Making
- Assignments
- Communication
- Conflict Resolution
- Resource Management

Presentation (25 Points)

- Delivery
- Clarity
- Duration
- Questions & Answers
- Visual Aids

Theme (5 points)

- SAE 2012 World Congress theme -
“GetConnected”

PLEASE READ CAREFULLY: The following is an explanation of the judging criteria, along with suggestions to guide students in preparing for the competition.

Punctuality

- 5 points automatically deducted if you are not at your booth by 10:00 a.m. or for the entire duration of the Student Exhibit Competition (should end around 1:00 p.m. and awards will be announced that afternoon). Remember to allow plenty of time for parking.

Description of Judging Criteria

Usage of SAE Technical Standard (10 points)*

- Identify and define a SAE Technical Standard – pick a system within your project and research the SAE Standards website for a standard that can be affiliated to that system.
- Explain the relevance of that Standard to your Exhibit/Project – how does that standard create constraints for your design? What additional testing would you or did you have to do to meet the SAE Standard? Provide a hard copy of that requirement for the judges.

Technical Content (30 points)

- Problem Definition – what issue(s) are you addressing? Why? What are the engineering challenges?
- Background – this is a critical part of every project. It is important to be aware of advances in the same area in order not to re-invent the wheel and not to impinge on existing patents. Sources for background information include technical papers, journals, magazines, U.S. patents, etc.
- Innovation – what is your novel concept for solving the problem and meeting your objectives?
- Research & Development – how did you solve the problem? What engineering tools (e.g. analytical models, CAE) did you apply?
- Implementation – successful implementation of a technology in a practical project is as important as the development of that technology.

- Validation – what was done to test your component designs and/or your completed products? Were special testing procedures developed?

□ **Presentation (25 points)**

- Delivery – good presentation delivery is accomplished by looking at the audience, by speaking with a loud and articulate voice, and by employing variable vocal tones to convey important points.
- Clarity – an essential ingredient of a good presentation. Thoughts should be well structured to provide a natural flow from one point to the next.
- Duration – **your presentation, including Q&A, must be completed within the allocated time of 10 minutes**. Lengthy, complicated details should be avoided in order to maintain the interest of the audience. Strive for a balance between duration and content.
- Questions & Answers – ensure you allocate time to answer questions when planning the length of your presentation. Questions should be answered concisely, without launching into a whole new presentation. Make sure you completely understand questions before answering them.
- Visual aids – they can serve as powerful tools for supporting a presentation and answering questions. They include hardware, signs, computer demonstrations, etc.

□ **Display (20 points)**

- Content – booths should be used to display SAE projects that your chapter has been involved in. Display items should be chosen carefully to completely portray not only the technical content of your work but also the process you followed in completing your project. Appropriate display vehicles include any vehicle constructed by your SAE chapter (e.g. Formula SAE, Baja, clean snowmobile).
- Organization – your booth should be organized in a functional manner. It should serve both to showcase your project and to support your presentation. Make sure to consider appropriate placement of displays and posters such that they are visible to all members of the audience.
- Quality – exhibits must be professional in appearance. Display items should be labeled with signs using a font large enough to be read from a reasonable distance. Special effort should be dedicated to maintaining a clean, organized booth.
- Booth space – your display must fit within a 10' x 20' booth. Please contact Lynn Norwood at the SAE Detroit Section office at (248) 324-4445 ext. 5 or lnorwood@sae-detroit.org for all special requests.

□ **Teamwork / Project Management (10 points)**

- Planning – teamwork should be demonstrated in project planning, execution, booth staffing, and presentation. How was planning accomplished? Who was responsible for defining the project scope, the completion strategy, operational objectives, critical limitations and milestones?
- Decision making – what sort of decision making process was employed throughout your project?
- Assignments – how was the workload divvied up between team members? How was a systems approach employed?
- Communication – how was the progress of individual team members communicated to the team as a whole? What forms of communication (e.g. reports, memos, e-mails, phone calls) were employed to keep the team abreast of and involved in the progress of individual members?
- Conflict resolution – what steps were taken to resolve conflicts, such that the project was able to advance as a whole?
- Resource management – what resources were required for the various tasks? Resources include people, machine shops, transportation, money, computer facilities, etc. How did the team schedule work to take into account resource availability? In general, how was progress tracked and updated? If a milestone was not attained by the designated date, what sort of recovery plan was developed? What corrective actions had to be taken to keep the project on time?

□ **Theme (5 points)**

- Incorporate the SAE 2012 World Congress theme “*GetConnected*” into your exhibit. This is an easy five points so be sure to include the theme in your presentation.

General Suggestions

- One possible approach for your display would be to provide an overview of your SAE design project; highlighting some specific technology you developed using a problem-solution format. For example,

you could discuss the optimization of one specific component. The old component could be displayed along with a poster listing the engineering challenges that were addressed and the techniques used to improve it. The new component could be displayed alongside (or just photographed if difficult to remove) with a board defining the performance improvements (e.g. reduced weight, reduced size, increased stiffness, improved manufacturability, etc.). This style of presentation provides a high level overview and a more complete description of a smaller problem. While the big picture needs to be conveyed, the individual problems are often more interesting and better showcase your engineering prowess. Look for opportunities to report performance improvements relative to a baseline or a design goal. This makes the results easier to relate and all the more impressive.

- Another possible approach might entail presenting technology improvements relative to the Congress theme focus area across multiple SAE vehicle programs/projects.

*Example of Technical Standard Usage:

J2582 - Automotive Ductile Iron Castings for High Temperature Applications

J2582 Scope:

This SAE Standard covers the hardness, chemical analysis and micro structural requirements for ductile iron castings intended for high temperature service in automotive and allied industries. Commonly known as SiMo ductile iron, typical applications are in piston-engine exhaust manifolds and turbocharger parts. Castings may be specified in the as-cast or heat treated condition. For design purposes, the Appendix provides general information on the application of high temperature ductile iron castings, their processing conditions, chemical composition, mechanical properties and microstructure.

Proper understanding of the Technical standards is essential to apply the standard appropriately for this competition. The team could explain why a specific component is cast iron and if it is considered a high-temperature application, as well as some measured data (i.e. actual data measured with a thermocouple) that could define the peak temperature during usage. A review of the material characteristics in that component that enable it to withstand the high temperature could also be discussed. Always state how your information relates to the SAE standard. Provide a hard copy of the standard for reference.